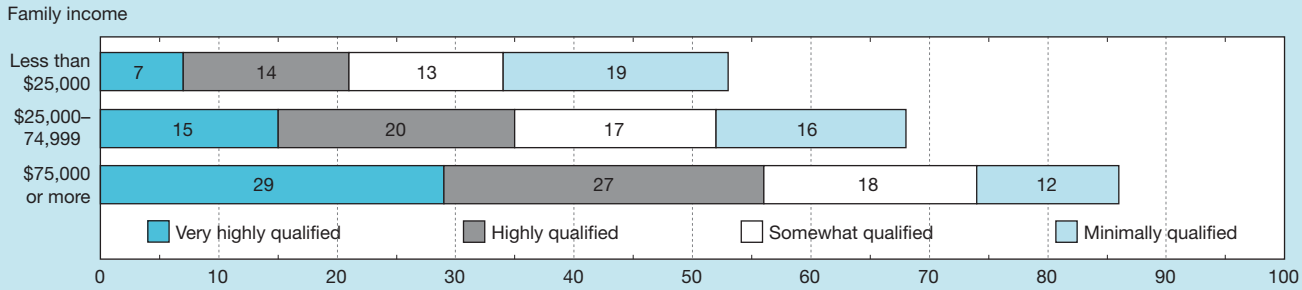
Who is Prepared for College?

High school graduates from low-income families enter four-year institutions at lower rates than their higher income peers (NCES 2000a). Although financial barriers to college attendance exist for many low-income students, another reason for their lower enrollment rate is that they are less qualified academically. (See figure 1-21.) NCES constructed a 4-year College Qualification Index, based on high school grade point average, senior class rank, aptitude test scores from the National Educational Longitudinal Study of 1988, SAT or ACT scores, and a measure of curricular rigor (see NCES 2000a for details). On this index, 86 percent of 1992 high school graduates from families with high incomes ($75,000 or more) were at least minimally academically qualified for admission to a four-year institution compared with 68 percent of those from middle-income ($25,000 to $74,999) and 53 percent from low-income (less than $25,000) families. Moreover, high-income graduates were almost twice as likely as middle-income graduates and four times as likely as low-income graduates to be very highly qualified for four-year college admission. The proportion of college-qualified students was also directly related to their parents' educational attainment.

Asian/Pacific Islander and white graduates have higher average family income and parental education levels than their black and Hispanic counterparts. Reflecting this pattern, Asian/Pacific Islander and white graduates were more likely than black and Hispanic graduates to be at least minimally qualified for four-year college admission. The proportion of very highly qualified graduates was largest among Asians/Pacific Islanders.

SOURCE: NCES 2000a.

Figure 1-21.
Percentage of 1992 high school graduates qualified for admission at a four-year institution, by level of qualification and family income



NOTE: Four-year college qualification index is based on high school grade point average, senior class rank, National Educational Longitudinal Study (NELS) 1992 aptitude test, SAT scores, and a measure of curricular rigor.

SOURCE: National Center for Education Statistics, *The Condition of Education 2000*, NCES 2000-062 (Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement: 2000a).

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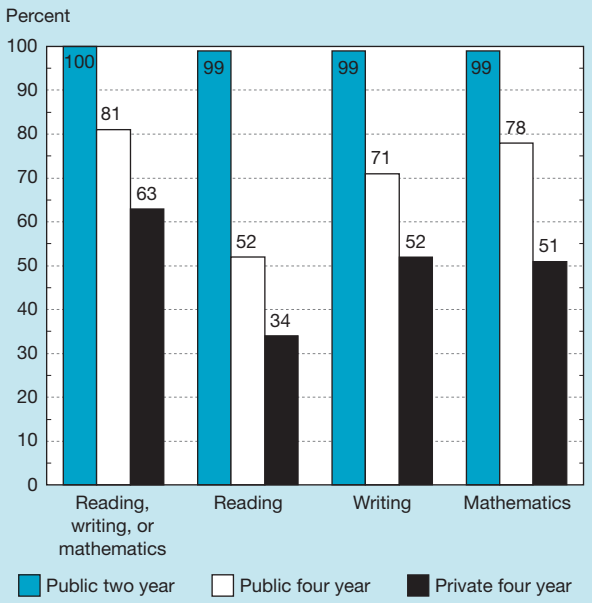
Conclusion

This chapter presented indicators of the status and change in U.S. elementary and secondary schools regarding student achievement, math and science coursetaking, implementation of content standards and state-level testing, curriculum structure and amount of time allocated to math and science compared with other countries, teacher quality (including initial training and professional development), teacher working conditions, access to and use of technology in schools, and transition to higher education. Although these indicators do not tell the whole story, they do highlight improvements in our K–12 education system over the past few decades while pointing to areas of enduring concern.

Observations made about U.S. mathematics and science education in 1947 noted that textbooks were thick and included unnecessary information and that teachers did not have sufficient training in mathematics (NSB 2000). Significant efforts have been made to reform elementary and secondary schools since 1947, such as those stimulated by *Sputnik* in 1957, the National Commission on Excellence in Education in 1983, and the National Education Goals that grew out of the Governor's summit of 1990. The national policy goals and educational standards for mathematics and science education set new and higher expectations for U.S. schools, students, and teachers. The indicators in this chapter were chosen to measure how close the nation has come to meeting those expectations.

A higher proportion of students graduate from high school with advanced courses in mathematics and science than did their counterparts three decades ago. As measured by NAEP, student achievement in mathematics and science has increased since the mid-1970s, although relatively few students are attaining levels deemed Proficient or Advanced by NAGB, and the performance of U.S. students continues to rank substantially below that of students in a number of other countries. Furthermore, the relative performance of U.S. students compared to their counterparts in other countries appears to de-

Figure 1-22.
Percentage of postsecondary education institutions offering remedial courses, by type of course and type of institution: fall 1995



SOURCE: National Center for Education Statistics, *The Condition of Education 2000*, NCES 2000-062 (Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement: 2000a).

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cline as students progress through school and it also affects our most advanced students.

Girls have closed much of the gender gap in mathematics achievement, although a larger share of boys continue to perform at the most advanced levels; the gender gap in science achievement has also narrowed. The gap between high and low performers remains wide, however, and black and Hispanic students continue to perform far below their white counterparts.

An explicit goal of educational standards for mathematics and science is that all students, without regard to gender, race, or income, participate fully in challenging coursework and achieve at high levels. The disparate performance among racial/ethnic groups is still observed when transcripts are examined. Asian/Pacific Islander and white students are much better represented in advanced courses than are black and Hispanic students. Racial/ethnic differences in math and science achievement persist among students taking similar courses in high school, primarily reflecting the large achievement gaps evident before high school entry.

In the 1980s, most states approved policies aimed at improving the quality of K–12 education by implementing statewide curriculum guidelines and frameworks as well as assessments. At present, half of the states require students to pass some form of exit examination to graduate from high school, and others report that they are developing such tests. Teachers remain concerned, however, that standards do not always provide clear guidance regarding the goals of instruction and that schools do not yet have access to top-quality curriculum materials aligned with the standards. Although some states have recently delayed the introduction of high-stakes tests (i.e., tests that students must pass to either graduate or advance a grade), public support for the standards movement remains strong.

Public school teachers generally support the movement to raise standards, but they are less supportive than the general public. The vast majority of public school teachers feel that the curriculum is becoming more demanding of students, although they also feel that new statewide standards have led to teaching that focuses too much on state tests and that a significant amount of "teaching to the test" occurs.

Measuring the extent to which standards are linked to instruction that challenges students is difficult because available methods cannot measure quality directly. Available indicators focus on the amount of time students spend studying a subject (classwork and homework), the content of lessons, and the types of instructional resources used (e.g., textbooks). These data show that although U.S. students appear to receive at least as much classroom time in mathematics and science instruction as students in other nations, instruction in U.S. 8th-grade classrooms tends to focus on the development of low-level skills rather than on understanding and provides few opportunities for students to engage in high-level mathematical thinking.

Improvements in the quality of U.S. education cannot occur without the concurrence of teachers. Research suggests that the following factors are associated with teacher quality: having academic skills, teaching in the field in which the teacher received training, having more than a few years of experience (to be most effective), and participating in high-quality induction and professional development programs. It is still common for students to be taught math and science by teachers without academic training in those subjects, and this mismatch is worse in high-poverty schools.

Salaries for math and science teachers remain well below those of bachelor's and master's degree scientists and engineers in industry. Given that teacher retirements are on the rise, increased salaries provide a means of retaining good teachers and attracting the number of quality teachers needed to replace retirees. The difference between the annual median salaries of all bachelor's degree recipients and teachers has declined over the past 20 years, mainly due to increases in the relative size of the older teaching workforce and in salaries of older teachers.

The role of education technology in U.S. schools has been changing rapidly. Handheld calculators are commonly used in both U.S. homes and classrooms. About one-fourth of 4th-grade teachers and three-fourths of 8th-grade teachers report that they use calculators for solving complex problems. By 2000, nearly all schools reported that at least one computer was linked to the Internet and half of the classrooms had access to the Internet.

Finally, expectations of college attendance have increased dramatically over the past 20 years, even among low-performing students. More than two-thirds of high school graduates attend college, and a rising proportion have taken a college

preparatory curriculum in high school. The use of AP exams to gain college credit in high school has also increased, although research has shown that some colleges are less likely to award AP credit now than in the past. College-level remediation is also on the rise, and policymakers are increasingly concerned about the number of students needing to take remedial courses in college. The impact of these changes on the S&E pipeline is addressed in the next chapter.

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